will also be appreciated that the installation cost of a PIPS marker, being inherently permanent and maintenance-free, is significantly lower than the cost associated with traditional inspection methods. Future surveys do not require additional investments such as new magnets, coils or electronic systems. Unlike purported positioning methodologies heretofore known, PIPS is not susceptible to losses, vandalism, breakage, radio interference, signal interruption, false readouts, etc. Furthermore, no physical evidence above-ground is necessary to locate the same spot repeatedly over the life of the pipeline. PIPS system is vendor-independent, regardless of the detection technology used or the provider of such technology. Obviously, failure to record a PIPS marker points to problems with the inspection pig.

[0063] It should be evident to those skilled in the art that pipelines that transport virtually any type of product, including oil, natural gas, water, or any other similar material, may be marked as contemplated by the present invention. PIPS marks will be readily detected and identified by inspection with smart pigs or other common instruments or the like that detect changes in the thickness or composition of the steel or plastic material constituting the pipe wall or the like. Ultrasonic equipment used to inspect polyethylene or polypropylene pipe will also detect PIPS markings. It should also be clear that the benefits of being able to locate every piece of defective pipe anywhere far outweigh the modest installation cost. Pipe factory installation of the markings of the present invention could include such source-of origin information as the pipe manufacturer plant ID, batch, and the like. Similarly, installation in the field could indicate the presence of physical landmarks such as pipeline crossings or distances of pipelines to railroad crossings and bridges.

[0064] Many pipelines are identified with aerial markers that are typically visually verified from small plane surveys. These markers are not normally attached to the pipeline and are not recorded by the inspection instruments. Placement of PIPS marks on the pipe readily identify the mile post and provide clear correlation between above-ground references and PIPS markings on the buried pipe.

[0065] Similarly, in urban areas, PIPS code markings on pipelines traversing neighborhoods would help to minimize damage to private property when excavating pipelines during maintenance. Accurate above-ground satellite readings of the position of the PIPS markings would bring crews to within an inch of the exact position of the underlying pipeline. Additional PIPS markings on the pipeline could record distance to high voltage, optic, or other cables thereby avoiding accidents and expensive disruptions of service. Pipelines entering private property and having PIPS code would mark the boundaries of private property affected by the pipeline right of way. Of course, any defect detected by inspection instruments would promptly be located with minimum disruption of neighborhoods. Pipelines with PIPS markings near school zones, hospitals, and other public buildings would be quickly identified as areas of risk. Pipeline defects would be readily detected near urban areas and school zones. It will be appreciated by those skilled in the art that the above-ground markers such as posts are not normally marked on the pipeline. Unfortunately, a hazardous defect near a risk area would appear just as one in any other section of the pipeline. On the other hand, PIPS markings would help prioritize repair activities by managing risk.

[0066] Posts commonly seen in the public eye draw attention to railroad crossings. near a bridge at a busy intersection. Some railroad crossings, unfortunately, are not only situated near a bridge or the Like, but also implicate congested intersections. Such locations are typically identified with yellow posts to indicate the presence of a pipeline below. PIPS markings installed on the pipeline detected by inspection instruments would accurately define the beginning and end of the intersection, railroad crossing, and the highway nearby. The location of any potentially dangerous defect would be quickly assessed and prompt measures taken.

[0067] In commercial urban areas, pipelines crossing neighborhoods, especially in corridors of multiple pipelines could be advantageously marked with PIPS code. Not only could the number of pipelines in the corridor be recorded, but also the nature of the product being transported and the distance to the nearest pipeline. Pipeline crossings could have each pipeline marked with PIPS code indicating the distance to other pipelines installed below, above, or in proximity thereto. PIPS markings could provide additional details for a bend area. New neighborhoods or commercial developments in the area could be recorded on the PIPS pipe code. Even cathodic protection systems that protect pipelines from corrosion and that include rectifiers for impressing current upon the pipeline could be marked with PIPS code during maintenance to the rectifier connections to the pipeline.

[0068] Another benefit of the present invention pertains to national security. The location of buried pipelines on government property need not be disclosed to inspection companies. Indeed, the government agency responsible for the pipeline can develop its own PIPS code and then mark pipelines. It will be understood that the information recorded by smart pigs or another inspection instrument does not reveal any information to the inspection crews. Thus, pipelines in remote locations that are subject to terrorist attacks could be marked in situ without disclosing any information above-ground. Inspections with smart pigs would not require placing benchmarks on the ground for distance referencing.

[0069] Many other means of public transportation are required to carry special licenses, as well as information regarding weight, capacity, and other data. Information required by federal or state regulatory agencies could be recorded with PIPS code on the pipeline, providing information electronically after smart pig surveys or the like.

[0070] It is within the contemplation of the present invention to accumulate the pipeline identification and positioning information stored in a plethora of in situ PIPS codes on a worldwide basis. Obviously, access to such a knowledge database can not only assure that pipeline maintenance is economically effectuated, but also can, among other things, help provide pipeline safety and even national security. **FIG. 9** depicts a data flow diagram illustrating the database of the present invention. More particularly, there is shown PIPS database **900** having an accumulation of pipeline identification and positioning information stored in plurality of records **850**. Each such record corresponds to a sequence of positioning information for a pipeline segment, e.g., MP1, MP2, MP3, etc. In a manner known in the art, included in this database may be PIPS codes corresponding to split